

Claims

What is claimed is:

1. An apparatus for guiding at least one optical path for an optoelectronic transceiver, said apparatus comprising:

5 an input interface;

an output interface; and

at least one bent element being disposed between said input and output interfaces;

said at least one bent element being adapted to provide at least one optical path;

said at least one bent element being adapted to avoid premature mechanical failure.

10 2. The apparatus according to Claim 1, wherein said at least one bent element comprises at least one optoelectronic fiber.

3. The apparatus according to Claim 2, wherein said at least one optoelectronic fiber is integrally adhered to said input and output interfaces.

4. The apparatus according to Claim 3, wherein said at least one optoelectronic
15 fiber is integrally adhered to said input and output interfaces via baking.

5. The apparatus according to Claim 1, wherein said at least one bent element comprises at least one waveguide.

6. The apparatus according to Claim 5, wherein said at least one waveguide is etched from at least one glass sheet.

5 7. The apparatus according to Claim 1, wherein said input and output interfaces comprise at least one V-shaped groove which accepts at least one end of at least one said bent element.

8. The apparatus according to Claim 1, wherein said at least one bent element comprises one element for providing optoelectronic transmission and one element for
10 providing optoelectronic reception.

9. The apparatus according to Claim 1, wherein said at least one bent element includes a bending radius of less than about 2.5 mm.

10. The apparatus according to Claim 1, wherein at least one of said input interface and said output interface comprises silicon.

15 11. The apparatus according to Claim 1, said apparatus comprising a base element and a cover element, said base element and said cover element combining to form said input interface and said output interface.

12. A method of forming apparatus for guiding at least one optical path for an optoelectronic transceiver, said method comprising the steps of:

providing an input interface;

providing an output interface;

5 disposing at least one bent element between said input and output interfaces;

adapting said at least one bent element to provide at least one optical path; and

adapting said at least one bent element to avoid premature mechanical failure.

13. The method according to Claim 12, wherein said step of providing at least one bent element comprises providing at least one optoelectronic fiber.

10 14. The method according to Claim 13, wherein said disposing step comprises integrally adhering said at least one optoelectronic fiber to said input and output interfaces.

15 15. The method according to Claim 13, wherein said step of adapting said at least one bent element to avoid premature mechanical failure comprises baking said at least one optoelectronic fiber.

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16. The method according to Claim 15, wherein said step of baking comprises baking in an oven in air at between about 1000 and about 1100 degrees Celsius.

17. The method according to Claim 16, wherein the duration of said baking step is about 15 minutes.

5 18. The method according to Claim 15, wherein:

said step of providing at least one optoelectronic fiber comprises providing a buffer layer on said at least one optoelectronic fiber; and

during said baking step, said buffer layer is burned off.

19. The method according to Claim 15, wherein:

10 at least one of said input interface and said output interface comprises silicon;

said baking step comprises anchoring said at least one optoelectronic fiber to at least one of said input interface and said output interface via SiO₂ sintering.

20. The method according to Claim 15, wherein said steps of providing an input interface and said step of providing an output interface comprise providing a base element
15 and a cover element, said base element and said cover element combining to form said input interface and said output interface.

21. The method according to Claim 20, wherein:

said cover element and said base element comprise silicon;

said baking step comprises anchoring said cover element and said base element to each other via SiO₂ sintering.

5 22. The method according to Claim 12, wherein said step of providing at least one bent element comprises providing at least one waveguide.

23. The method according to Claim 22, wherein said step of providing at least one waveguide comprises etching at least one waveguide from at least one glass sheet.

10 24. The method according to Claim 23, wherein said step of providing at least one waveguide further comprises:

providing a silicon wafer; and

mounting said at least one glass sheet on said silicon wafer.

15 25. The method according to Claim 24, wherein said mounting step comprises providing an adhesive and bonding said at least one glass sheet to said silicon wafer using said adhesive.

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26. The method according to Claim 22, wherein said step of providing at least one waveguide further comprises the step of depositing an etch-masking layer on said at least one glass sheet.

27. The method according to Claim 26, wherein said step of providing at least one waveguide further comprises the steps of:

providing a photoresist layer is over said etch-masking layer;

exposing and developing said photoresist layer; and

delineating said etch-masking layer to produce a replica of desired geometry for said at least one waveguide.

28. The method according to Claim 27, wherein said etching step further comprises the step of etching said at least one waveguide out of said at least one glass sheet with the aid of the patterned etch-masking layer.

29. The method according to Claim 12, wherein said disposing step comprises:

providing at least one V-shaped groove in at least one of said input and output interfaces; and

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disposing at least one end of at least one said bent element in said at least one V-shaped groove.

30. The method according to Claim 12, wherein said step of providing at least one bent element comprises providing one element for providing optoelectronic transmission
5 and one element for providing optoelectronic reception.

31. The method according to Claim 12, wherein said step of providing at least one bent element comprises providing at least one bent element that includes a bending radius
of less than about 2.5 mm.

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